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GEOGRAPHIC VARIATION IN NON-CALIFORNIA POPULATIONS OF THE RUFOUS-CROWNED SPARROW

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INTRODUCTION

Aside from Ridgway's (1901:246-253) treatment, no review of any large segment of the populations of the Rufous-crowned Sparrow (*Aimophila ruficeps*) has ever been published. In this paper, I review populations from all but California and Baja California, i.e., from Arizona to Oklahoma and southward to southern Oaxaca. Over this range, the Rufous-crowned Sparrow occurs in grassy shrublands and similar habitats on slopes and other rough country, from near sea level to elevations of 7,000 feet or more. As far as I have been able to determine, the species is essentially resident throughout the above range, although some altitudinal movement may occur during the year.

Acknowledgments

I wish to express my deep appreciation to the many people who helped me in this study, particularly Allan R. Phillips, who provided me with copies of his notes, his excellent series of specimens, and his expertise on this interesting species. I also thank Curtis Adkisson, Luis Baptista, Rollin Baur, Ralph Browning, Richard Crossin, John duPont, Charles Ely, John Farrand, Ian Galbraithe, Thomas Howell, Ned Johnson, Lloyd and Julie Kiff, Roxie Laybourne, David Ligon, George Lowery, Robert Mengel, George Newman, David Niles, Kenneth Parkes, Raymond Paynter, Charles Sibley, Kenneth Stager, Robert Storer, George Sutton, Melvin Traylor, and John Weske for various kinds of help, including the selection of fresh-plumaged specimens for my borrowing. Collections used in this study were as follows (abbreviations refer to those used in the text in reference to specimens): American Museum of Natural History (AMNH), University of Minnesota—Bell Museum

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of Natural History (MMNH), California Academy of Sciences (CA), Carnegie Museum of Natural History (CM), Cornell University Langmuir Laboratory, Delaware Museum of Natural History (DMNH), Field Museum of Natural History (FMNH), Hardin-Simmons University, Los Angeles County Museum, Louisiana State University Museum of Zoology (LSU), University of Michigan Museum of Zoology (UMMZ), Moore Laboratory of Ornithology—Occidental College (MC), Museum of the High Plains at Fort Hays Kansas State College, Museum of Natural History—University of Kansas (KU), Museum of Southwestern Biology at the University of New Mexico (MSB), Museum of Vertebrate Zoology—University of California (MVZ), Neotropical Research Foundation (NT), Yale University Peabody Museum, Allan R. Phillips Collection (now in DMNH), Stovall Museum—University of Oklahoma (OU), George M. Sutton Collection (now in DMNH), University of California at Los Angeles—Dickey Collection, U.S. National Museum of Natural History (US), and Western Foundation of Vertebrate Zoology (WF).

MATERIALS AND METHODS

Relatively fresh (variously and mainly early autumn to early winter) specimens are essential for the proper assessment of coloration in this species, as wear, fading, and other changes obscure characters to a considerable degree—especially by late spring and summer. Foxing was not found to be a serious problem in most unworn specimens, although some reddening (as well as soiling) was found in some. For color comparisons, I assembled almost 300 specimens in largely or fully complete fresh adult (definitive) plumage: Arizona 54, New Mexico 20, Oklahoma 33, Texas 36, Sonora 24, Chihuahua 9, Coahuila 9, Nuevo León 9, Tamaulipas 14, Sinaloa 10, Durango 3, San Luís Potosí 6, Nayarit 3, Jalisco 10, Guanajuato 10, Querétaro 1, Michoacán 7, Hidalgo 2, Veracruz 2, Distrito Federal 8, Puebla 3, Guerrero 11, and Oaxaca 13.

In addition, many of the over 100 juvenal specimens that I examined were in molt and had some to many new feathers of the definitive plumage. Finally, at least some of the almost 600 additional specimens in more-worn plumage were moderately helpful in assessing populational plumage characters.

Color comparisons were made under indirect natural lighting, with specimens assembled into geographic samples on the basis of their overall similarities. Geographic samples were subjected to mensural analysis, with subsamples used when measurements or geographic consideration

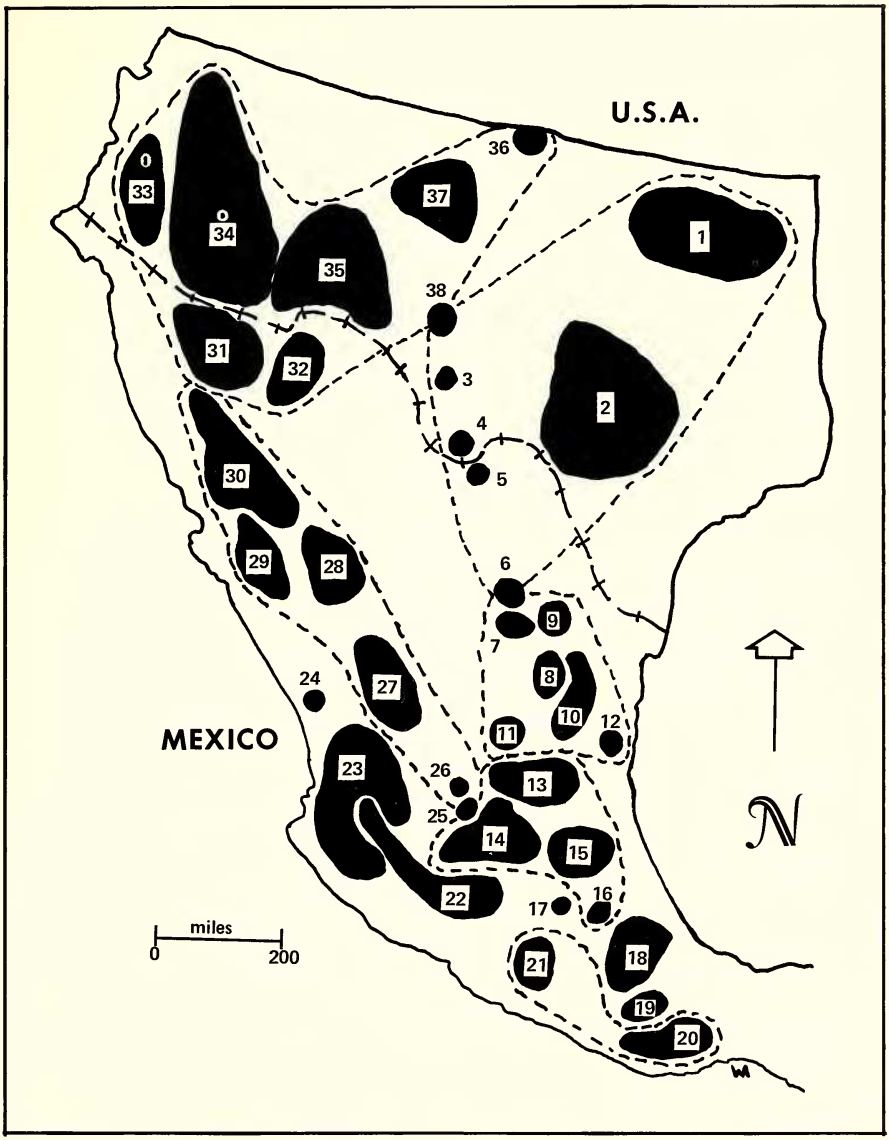

Figure 1: Populations and subspecies of *Aimophila ruficeps* (see also Tables 1 and 2). 1-5, *eremoeca*; 6, *eremoeca* × *pallidisima*; 7-12, *pallidisima*; 13-16, *boucardi*; 17 *duponti*; 18, *laybournae*; 19, *australis*; 20-21, *extima*; 22, *fusca*; 23, *suttoni*; 24, *phillipsi*; 25, *boucardi* × *simulans*; 26-30, *simulans*; 31-37, *scottii*; 38, *scottii* × *eremoeca*.

suggested a need for such division (Fig. 1). Measurements used were length of wing (chord), tail, and culmen (from nostril), as well as bill depth and mandible width at the base. (Body weights were also accumulated, but too few were available to analyze in detail.) No attempt was made to segregate mensurally the age classes of definitively plumaged specimens, and wing and tail length are included from grown juveniles.

Means ($\bar{X}$) were calculated for all measurements, along with standard deviation (S.D.) for samples of five or more specimens. Where means were more than one S.D. apart, I used the Mann-Whitney U tests (Steel and Torrie, 1960) to compare populations. The level for significant was set at .05. In general, adjacent populations were found not to differ significantly in measurements, and in most cases the values are presented in the Subspecies Accounts with little comment (see Variation in Measurements and Tables 1 and 2).

Table 1: Wing (Chord) and Tail Lengths (mm) in Subspecies and Populations of *Aimophila ruficeps*

Subspecies and Populations	Males						Females					
	Wing			Tail			Wing			Tail		
	N	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*
eremoeca												
1. C Oklahoma	21	65.6	1.6	16	68.7	2.2	12	62.3	1.9	10	65.5	2.3
2. C Texas	39	64.8	2.2	19	66.6	2.2	18	61.8	1.4	11	65.4	3.0
3. Davis Mts.	18	65.0	2.4	11	66.0	3.1	6	61.6	2.5	2	64.7	—
4. Chisos Mts.	18	65.0	1.9	11	68.2	2.3	13	62.5	1.5	8	66.2	2.4
5. Sa. del Carmen	7	64.1	2.4	5	68.3	2.0	2	59.2	—	1	60.0	—
eremoeca × *pallidisima*												
6. S Coahuila	2	64.0	—	1	69.0	—	3	60.0	—	3	65.7	—
pallidisima												
7. Saltillo	12	64.4	3.0	8	69.0	2.6	12	61.3	0.9	10	67.6	1.8
8. C Nuevo León	18	62.7	1.6	10	66.0	1.8	7	59.9	1.3	3	62.8	—
9. Monterrey	10	62.9	2.0	8	64.1	2.4	8	60.9	3.6	7	63.1	3.0
10. SW Tamaulipas	36	62.2	2.4	21	63.4	3.6	10	60.6	1.7	4	62.7	—
11. N S. L. Potosí	5	62.1	1.9	5	64.9	2.0	2	60.5	—	2	67.5	—
12. SE Tamaulipas	9	60.0	2.1	9	60.8	2.0	9	58.8	2.6	5	59.4	2.0

boucardi												
13. S S. L. Potosí	20	64.9	2.5	14	66.3	4.1	3	60.0	——	1	65.5	——
14. Guanajuato	11	65.0	1.6	8	68.1	1.2	5	62.6	1.6	4	67.2	——
15. Hidalgo	18	64.7	2.2	11	68.4	4.2	4	59.7	——	4	63.6	——
16. C Puebla	4	64.0	——	3	67.0	——		————			————	
duponti												
17. Distrito Federal	14	66.1	1.7	7	71.4	2.2	5	65.0	1.3	5	69.5	3.4
laybournae												
18. S Puebla	13	62.1	2.7	12	63.6	2.7	3	62.9	——	3	61.2	——
australis												
19. C Oaxaca	5	60.5	2.4	5	61.7	0.8	3	58.8	——	3	60.0	——
extima												
20. S Oaxaca	11	61.6	2.5	11	63.1	4.1	12	58.9	4.1	10	61.5	2.0
21. Guerrero	36	60.9	1.9	9	62.1	3.0	27	60.2	2.5	14	62.8	2.4
fusca												
22. Michoacán	17	63.6	1.6	14	63.6	2.5	18	60.2	1.4	12	61.9	3.5
suttoni												
23. Nayarit	36	61.4	2.2	30	60.7	2.7	15	58.9	2.9	11	59.6	3.2
phillipsi												
24. SE Sinaloa	10	60.4	1.6	8	62.9	3.0	5	57.6	2.1	5	60.6	1.3
boucardi × *simulans*												
25. N Guanajuato	7	63.4	1.6	7	65.2	2.3	3	61.5	——	2	66.2	——
simulans												
26. Jalisco	3	60.8	——	2	66.2	——	2	60.2	——	1	61.5	——
27. SW Durango	14	64.8	1.3	8	68.8	3.0	5	62.0	2.1	5	64.9	4.3
28. NW Durango	10	62.4	0.9	10	64.8	4.0	7	60.9	1.9	8	62.5	4.8
29. NE Sinaloa	14	60.6	1.8	13	61.5	2.9	9	57.6	1.6	6	60.0	1.4
30. S Sonora	22	63.2	2.2	12	64.8	3.1	13	59.7	2.2	7	61.3	2.6
scottii												
31. N Sonora	32	64.7	1.9	12	68.4	3.3	14	62.0	1.1	9	66.8	1.6
32. NW Chihuahua	4	64.6	——	2	68.5	——	5	61.6	2.5	3	62.7	——
33. W Arizona	13	65.0	2.2	11	69.5	2.9	6	61.6	1.8	5	67.3	1.7
34. C Arizona	31	65.5	1.6	25	68.9	2.8	23	63.2	2.1	19	67.1	2.3
35. SW New Mexico	22	65.4	2.0	12	70.8	2.2	6	62.4	1.2	2	67.0	——
36. W Oklahoma	7	67.9	2.9	3	74.3	——	5	64.2	2.3	4	69.6	——
37. E New Mexico	5	66.9	1.6	2	70.0	——	2	66.7	——	1	70.0	——
scottii × *eremoeca*												
38. Guadalupe Mts.	4	66.4	——	3	74.2	——	7	63.6	1.7	3	67.2	——

Table 2: Bill Measurements (mm) of Subspecies and Populations of *Aimophila ruficeps*

Subspecies and Populations	Males									Females								
	Length			Width			Depth			Length			Width			Depth		
	N	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*
eremoeca																		
1. C Oklahoma	24	8.7	0.5	25	6.4	0.3	23	6.4	0.2	10	8.5	0.5	10	6.2	0.1	7	6.4	0.2
2. C Texas	38	8.5	0.4	37	6.2	0.3	30	6.3	0.2	17	8.5	0.4	17	6.1	0.3	15	6.2	0.3
3. Davis Mts.	11	8.5	0.3	11	6.2	0.3	10	6.1	0.2	4	8.1	——	4	6.0	——	2	6.1	——
4. Chisos Mts.	17	8.6	0.4	18	6.1	0.2	11	6.1	0.2	10	8.6	0.3	10	6.2	0.2	7	6.0	0.3
5. Sierra del Carmen	6	8.4	0.4	6	6.0	0.2	6	6.2	0.3	2	8.3	——	2	6.0	——	1	6.0	——
eremoeca × *pallidisima*																		
6. S Coahuila	2	8.2	——	2	6.1	——	2	5.9	——	3	8.3	——	3	6.1	——	2	6.1	——
pallidisima																		
7. Saltillo	10	8.7	0.3	9	6.2	0.3	8	6.1	0.3	11	8.4	0.2	11	6.2	0.3	9	5.9	0.2
8. C Nuevo León	12	8.7	0.2	12	6.2	0.3	10	6.3	0.2	7	8.6	0.4	4	6.2	——	2	5.8	——
9. Monterrey	10	8.6	0.4	9	6.4	0.4	6	6.3	0.3	8	8.6	0.4	8	6.3	0.3	7	6.2	0.3
10. SW Tamaulipas	33	8.6	0.4	34	6.3	0.3	30	6.3	0.2	10	8.5	0.5	10	6.1	0.3	6	6.2	0.3
11. N San Luís Potosí	5	8.6	0.2	5	6.5	0.1	4	6.3	——	2	8.3	——	2	5.8	——	2	6.0	——
12. SE Tamaulipas	9	8.9	0.3	8	6.3	0.3	7	6.3	0.3	9	8.7	0.4	9	6.3	0.2	8	6.2	0.2
boucardi																		
13. S San Luís Potosí	21	8.2	0.4	21	6.2	0.2	19	6.2	0.2	3	8.8	——	3	6.6	——	2	6.1	——
14. S Guanajuato	10	8.0	0.4	10	6.2	0.2	9	6.5	0.2	5	8.3	0.2	5	6.3	0.2	5	6.4	0.4
15. Hidalgo	18	8.5	0.3	18	6.3	0.3	15	6.4	0.3	4	8.5	——	4	6.2	——	3	6.2	——
16. C Puebla	3	8.3	——	2	6.3	——	3	6.4	——	———			———			———		
duponti																		
17. Distrito Federal	13	8.4	0.4	14	6.2	0.2	10	6.4	0.3	7	8.1	0.4	6	6.1	0.2	6	6.1	0.2
laybournae																		
18. S Puebla	10	8.3	0.4	10	6.2	0.2	6	6.4	0.2	3	8.6	——	3	6.3	——	2	6.1	——

australis																		
19. C Oaxaca	4	8.0	——	4	6.1	——	4	6.1	——	3	7.7	——	4	6.0	——	3	6.2	——
extima																		
20. S Oaxaca	11	8.2	0.3	11	6.3	0.3	7	6.3	0.2	12	8.1	0.4	12	6.1	0.2	10	6.1	0.3
21. Guerrero	33	8.4	0.4	30	6.2	0.3	18	6.3	0.4	23	8.5	0.4	25	6.2	0.4	17	6.3	0.2
fusca																		
22. Michoacán	15	8.1	0.4	14	6.4	0.3	13	6.3	0.3	17	8.1	0.4	18	6.2	0.3	11	6.3	0.3
suttoni																		
23. Nayarit	33	8.2	0.4	28	6.4	0.3	25	6.3	0.3	12	8.1	0.4	13	6.3	0.3	9	6.3	0.2
phillipsi																		
24. SE Sinaloa	11	8.2	0.5	11	6.3	0.2	10	6.2	0.3	4	8.5	——	4	5.9	——	3	6.0	——
boucardi × *simulans*																		
25. N Guanajuato	7	8.1	0.5	7	6.2	0.1	6	6.1	0.2	3	7.7	——	3	6.2	——	3	6.3	——
simulans																		
26. Jalisco	3	7.9	——	3	6.3	——	1	5.9	——	1	7.4	——	2	6.5	——	1	6.1	——
27. SW Durango	12	8.1	0.4	13	6.2	0.4	11	6.1	0.3	3	8.2	——	3	6.3	——	2	6.7	——
28. NW Durango	11	8.0	0.4	10	6.2	0.2	9	5.9	0.3	10	8.0	0.4	9	6.1	0.2	8	6.0	0.1
29. NE Sinaloa	14	8.0	0.3	13	6.1	0.3	14	6.1	0.2	7	8.1	0.2	7	6.0	0.3	6	6.0	0.1
30. S Sonora	20	8.4	0.4	19	6.1	0.3	14	6.2	0.2	12	8.0	0.4	12	6.0	0.3	10	6.0	0.1
scottii																		
31. N Sonora	31	8.3	0.3	30	6.1	0.2	27	6.1	0.3	14	8.1	0.3	14	6.1	0.2	10	5.9	0.1
32. NW Chihuahua	4	8.2	——	4	5.9	——	2	6.2	——	4	8.1	——	4	5.7	——	3	5.8	——
33. W Arizona	11	8.3	0.3	12	6.1	0.2	9	6.0	0.3	6	8.3	0.1	6	6.0	0.1	5	6.1	0.2
34. C Arizona	22	8.1	0.4	24	6.1	0.2	18	6.2	0.2	19	8.3	0.4	17	6.0	0.3	12	5.8	0.1
35. SW New Mexico	21	8.3	0.5	22	6.1	0.2	17	6.1	0.3	5	8.2	0.2	5	6.0	0.2	5	6.0	0.2
36. W Oklahoma	6	8.1	0.3	6	6.1	0.1	5	5.9	0.2	4	8.0	——	4	6.2	——	3	6.1	——
37. E New Mexico	3	8.2	——	3	5.9	——	2	6.2	——	2	7.5	——	2	5.9	——	2	5.8	——
scottii × *eremoeca*																		
38. Guadalupe Mts.	3	8.6	——	3	6.0	——	3	5.9	——	5	8.4	0.3	5	6.1	0.4	4	6.2	——

MOLT

Following the postjuvenal molt (partial), *A. ruficeps* appears to have only one molt per year, i.e., the postnuptial molt (complete). The latter molt occurs between late summer and late autumn, following the breeding season. In a very few specimens, I have seen scattered pin feathers in spring birds, these being on the throat and chin. A few spring specimens were encountered in which the plumage was rather fresh, suggesting that the body feathers had been recently molted. These birds were all from Jalisco (two races), i.e., Jacala, 6 and 7 March 1897 (US); San Sebastián, 22 March 1897 (US); Etzatlán, 18 June 1892 (US); and near Mazamitla, 15 May 1959 (DMNH). (See Acknowledgments for explanation of collection abbreviations.) I do not know the significance of the fresh plumage in these specimens, but obviously these birds are atypical in regard to the plumage cycle of the species as a whole.

SUBSPECIES ACCOUNTS

In the following accounts, emphasis is placed on the diagnosis and description of populations based on specimens in or assuming fresh definitive plumage. Also included are sections on measurements, juvenal plumage, specimens examined, and the ranges of populations and subspecies. My emphasis on fresh, definitively plumaged specimens has already been alluded to, i.e., characters in other specimens are obscured by wear and other factors. This obscuring of characters means that many specimens now in collections are essentially useless for subspecific identification, while others are only provisionally assignable to race. As far as juvenal plumage is concerned, I have not made an extended attempt to study and compare this in the populations in question, as samples are even less adequate in many cases than are those of fresh, definitively plumaged specimens. However, I have included brief descriptions and comparisons of juveniles, where these have been available. In general, much remains to be learned concerning the geographic variation of populations of *A. ruficeps,* and I hope that the present study is accepted for what it is: a provisional and tentative assessment.

***Aimophila ruficeps eremoeca* (Brown).** Bull. Nuttall Orn. Club, 7:26, 1882. Type locality: Boerne, Kendall Co., Texas; type not examined and location unknown to me.

Diagnosis: In typical form, *eremoeca* is quite distinct from *scottii* to the west, differing in its more olive (or brownish) gray back and narrower, less extensive, and browner (less reddish) dorsal streaking. The underparts also tend to be paler and grayer, but much overlap exists in

this character. The culmen averages longer and the tail shorter in *eremoeca*, but the differences are not significant.

Description: The crown is Burnt Umber* to Vandyke Brown, but some birds have this redder and a few darker and browner. Dorsal streaking is variable in color, but it is typically Olive, varying to dark Hair Brown or Bister; in extent it varies from light to moderate and is usually narrow and/or diffuse (sometimes obsolete). The back is Hair Brown or paler. Breast and flanks are typically pale gray (light Smoke Gray), sometimes washed with buff. Wings and tail are light reddish brown, between Wood Brown and Mummy Brown.

Commentary: Even on the Edwards Plateau, Texas (site of type locality), variability in color exists in fresh-plumaged specimens. For example, in 14 November-January specimens, two (14.3%) have the upperparts grayer (lacking the olive-brown cast) and have the streaking redder and more extensive than in the rest of the series. Resembling these are two other specimens from farther north in Texas, i.e., one from Ranger and one from Brazos (both US). The latter is close to *scottii*, whereas the other three specimens could be regarded as intergrades. "Intergrades" also occur in the Davis Mountains (Davis Co.), Texas, but that population and those of the nearby Chisos Mountains and apparently the Sierra del Carmen, Coahuila (only April specimens seen), are close to *eremoeca*. *Eremoeca* probably also occurs farther southward, as southern Coahuila December specimens from 14 miles north of Saltillo (2—DMNH) and from 50 miles south of Monclova (2—MC) represent intergrades with *pallidisima*.

In Oklahoma, east of the Panhandle, specimens of *eremoeca* also display variability. Of 23 fresh-plumaged birds from there, nine (39.1%) are typical of *eremoeca*, six (26.0%) are close to *eremoeca*, three (13.0%) are intergrades, and five (21.9%) are close to *scottii*. Farther west, evidence of intergradation between *eremoeca* and *scottii* exists in populations from the Guadalupe Mountains (Texas) north to Cimarron Co., Oklahoma; however, I regard those populations as closer to *scottii*, under which race they are discussed.

In essence, then, *eremoeca* reveals some degree of variability—specifically toward *scottii*—even in specimens from the topotypical region; however, these atypical specimens are few and do not undermine the validity of the race. *Eremoeca* extends northward to Oklahoma with increasing intergradation toward *scottii*, but that northern segment is best called *eremoeca* toward *scottii*. The Guadalupe Mountains to westernmost Oklahoma birds are also intergrades, but I regard them as being closer to *scottii*. Finally, intergradation also occurs southward in Coahuila, i.e., *eremoeca* × *pallidisima*.

* Throughout the text, capitalized colors are from Ridgway, 1886.

Measurements: See Tables 1 and 2. Average differences in geographic samples exist in all the measurements, but none is significant.

Juvenal plumage: Above rather light brown (pale Hair Brown to Broccoli Brown) with darker (to Olive) streaks, especially on the crown and back; below rather dirty white (with pale buff on the abdomen and sometimes elsewhere), with variable amounts of streaking (Hair Brown to Olive), especially on the breast. Paler and grayer (less reddish) than most *scottii*.

Specimens examined: FRESH PLUMAGE—Oklahoma: Carter Co. 1, Comanche Co. 4, Haskell Co. 1, Jackson Co. 1, Kiowa Co. 2, Murray Co. 15; Texas: Brewster Co. 1, Comanche Co. 1, Davis Co. 5, Eastland Co. 1, Kendall Co. 2, Kerr Co. 15, Kinney Co. 2, Presidio Co. 1, Valverde Co. 1, county ? 1; Coahuila: 4 (*eremoeca* × *pallidisima*). MORE-WORN PLUMAGE —Oklahoma: Blaine Co. 1, Carter Co. 1, Kiowa Co. 3, Murray Co. 6; Texas: Bell Co. 3, Brewster Co. 28, Comal Co. 1, Davis Co. 11, Edwards Co. 1, Kendall Co. 2, Kerr Co. 19, Mitchell Co. 1, Presidio Co. 1, Travis Co. 1, Valverde Co. 4, county ? 4; Coahuila: 7 (plus 1 *eremoeca* × *pallidisima*). JUVENAL PLUMAGE—Oklahoma: Comanche Co. 1, Kiowa Co. 1, Marshall Co. 1; Texas: Brewster Co. 4, Davis Co. 12; Coahuila: 1.

Range: Central Texas north to central Oklahoma (where intergrades with *scottii* to some degree) and west to western Texas (Davis and Chisos Mountains) and the Sierra del Carmen, Coahuila. Intergrades in Guadalupe Mountains with *scottii* (which see) and in southern Coahuila (north of Saltillo) with *pallidisima*. Reports of this race occurring as a migrant in eastern Mexico, e.g., Hidalgo (Jacala), Puebla (Chachapa), Tamaulipas (Guiaves), and Veracruz (Maltrata) (Miller, et al., 1957: 377), appear in error. I have examined what are probably the specimens referred to above from all of the localities except Chachapa, i.e., Guiaves (MCZ), Jacala (Sutton Collection), and Maltrata (US); all appear to be representatives of local races rather than *eremoeca*.

***Aimophila ruficeps pallidisima* Phillips.** Bull. British Ornithologist Club, 86:156, 1966. Type locality: Cuesta Blanca, 19 km. W of Saltillo, Coahuila; 3 paratypes in the Moore Collection (one examined, MC 38,727).

Diagnosis: Resembles *eremoeca*, but the back darker, the more extensive dorsal streaking duskier or browner, and the crown darker; the breast and sides are also darker and sometimes buffier than in *eremoeca*. In measurements there is complete overlap, but topotypical *pallidisima* average longer-tailed than *eremoeca*; more eastern *pallidisima* average shorter in wing and tail than western birds of this race.

Description: In topotypical *pallidisima*, the crown is dark Walnut Brown to dark Burnt Umber. The dorsal streaking is usually moderate in extent and width and moderately sharp to rather diffuse; in color this is between light Clove Brown and Olive on the average, but varies to dark Sepia and even to dark Vandyke Brown. The back is typically light Hair Brown, varying to both grayer and to darker, richer brown. The breast and flanks are near Broccoli Brown, and the wings and tail are dark Mummy Brown.

Commentary: Contrary to Phillips (1966), *pallidisima* is not *that* pale and gray a race; indeed, there are definite brownish overtones in the dorsal ground color of topotypes, and their back streaking varies from dusky gray to grayish brown. Also contrary to Phillips, *pallidisima* appears not to be restricted to arid northeastern Mexico, but instead ranges eastward through the Sierra Madre Oriental to Nuevo León and Tamaulipas—although not in typical form.

In comparing five topotypical *pallidisima* with 12 other fresh-plumaged birds from southwestern Tamaulipas (MCZ), I found that only four (33.3%) of the latter were separable on the basis of the coloration of the upperparts. The separable Tamaulipas specimens had the upperparts darker and browner and/or the streaking darker and broader. Ventrally, the separation level was higher (50.0%), but again overlap is considerable. The separable Tamaulipas specimens have the breast and flanks darker and buffier (less grayish) than *pallidisima*. Similar comparisons with seven Monterrey area specimens showed only three (about 43.0%) to be separable from *pallidisima*, along the same lines as in the Tamaulipas specimens.

While the differences between Saltillo and certain more eastern birds are real enough, there are more similarities than differences in the two populations. Furthermore, with a more complete geographical representation, I suspect that a cline would be demonstrable between the paler *pallidisima* from west of the Sierra Madre Oriental and the darker, browner variants to the east. At this point I can see no justification for splitting these more eastern populations as a separate race. If one had the option of selecting a more suitable population to name, those of Tamaulipas or Nuevo León rather than Saltillo would be preferable. However, under the circumstances there is no recourse, and the name *pallidisima* should be applied as outlined above.

I am also provisionally including here the birds of the Sierra de Tamaulipas, Tamaulipas, although I suspect that population may be racially distinct. In the rather worn specimens available to me, there is an indication that the population is redder and paler than those to the west.

Finally, I include in *pallidisima* the birds from northern San Luís Potosí, i.e., Charcas, Wadley, Coyotillos, Villar (all LSU). Birds from the southern part of that state appear darker and browner and are best assigned to *boucardi*. Intergrades between *pallidisima* (sensu lato) and *boucardi* presumably occur farther south in San Luís Potosí, and I have also seen two specimens that can be so considered from southwestern Tamaulipas, i.e., Montalunga (FM) and Guiaves (MCZ).

Measurements: In wing and tail (Table 1), a cline of decreasing length exists from the Saltillo area eastward and southward, but only between Saltillo and the Sierra de Tamaulipas is the difference in wing significant ($P < .01$; H: $\bar{x}_1 = \bar{x}_2$). Males from Saltillo are significantly longer in tail than those of all other subsamples except central Nuevo León, with the latter being intergrades. Saltillo ♀♀ are longer in tail than all others; however, lacking specimens from intervening areas (e.g., westernmost Nuevo León), I cannot rule out the possibility that Saltillo ♀♀ intergrade with populations from farther east. Should intergradation not occur in ♀♀ or be abrupt in both sexes, one would probably be justified in separating more eastern populations as a distinct race (with a shorter tail than *pallidisima*), perhaps in spite of the overlap in color characters. In bill, all the subsamples overlap greatly in measurements.

Juvenal plumage: Compared to *eremoeca, pallidisima* is distinctly darker above (Hair Brown to almost Olive), often with streaking heavier above and below and with little buff on the underparts; the two juveniles from southeastern Tamaulipas are dark and reddish (Raw Umber to Bistre), with redder streaking and with more buff below—thus differing from *eremoeca* and the other *pallidisima* examined.

Specimens examined: Fresh plumage—Coahuila 5, Nuevo León 9, San Luís Potosí 4, Tamaulipas 14. More-worn plumage—Coahuila 18, Nuevo León 31, San Luís Potosí 2, Tamaulipas 46. Juvenal plumage—Coahuila 3, Nuevo León 8, San Luís Potosí 1, Tamaulipas 5.

Range: Southern Coahuila (intergrading northward with *eremoeca*) south to northern San Luís Potosí and eastward through Nuevo León to southwestern Tamaulipas (some intergradation with *boucardi*); provisionally included also is the population of southeastern Tamaulipas (Sierra de Tamaulipas), which may be a separate race.

Aimophila ruficeps boucardi **(Sclater).** Proc. Zool. Soc. London, 1867:1, pl. 11. Type locality: La Puebla [= Puebla, Puebla], Mexico; type in the British Museum (Natural History), 1885.2.10.488 (not examined).

Diagnosis: A distinctly brown race, darker and browner than *pallidisima*, with browner (less reddish or grayish) and often broader and sharper dorsal streaking. Overlap in size is considerable, but *boucardi* is similar in wing length, but shorter in tail, to topotypical *pallidisima*.

Description: The crown is dark Burnt Umber, varying to both lighter and darker shades. Back is Hair Brown in most birds, varying to Broccoli Brown in others. Dorsal streaking is extensive, generally broad, and rather sharp; the color is dark Prouts Brown, sometimes somewhat darker. Breast and flanks are Broccoli Brown to a grayer, paler brown, with some specimens washed with buff. Wings and tail are near dark Prouts Brown.

Commentary: Essentially homogeneous specimens were seen from San Luís Potosí (Jesús María—U.S.; Pendencia—LSU), Veracruz (Zacualpilla—KU), and Querétaro (San Juan del Río—MC), with more-or-less similar ones from Hidalgo (Portezuelo—MC), Guanajuato (Irapuato—MC; Acámbaro—DMNH), and Michoacán (Patambán—US). The less-typical series included some specimens that showed an approach to adjacent forms, but were judged nearest *boucardi*. These include a somewhat gray specimen (one of two birds) from Portezuelo, Hidalgo (MC) that approaches *pallidisima*; duller specimens from Patambán (single specimen—US) and Acámbaro (one of two birds—DMNH) that approach *fusca*; and a redder one (one of five birds—MC) from near Irapuato that approaches *simulans*.

Much more atypical than any of the above, in fact representing distinct intergradation, is a series (3 ♂♂, 2 ♀♀) from Rancho Enmedio, north of Guanajuato (MC). These specimens are somewhat worn (January), but they are clearly redder and paler than typical *boucardi*. I regard them as *boucardi* × *simulans*, the latter a race of the Sierra Madre Occidental.

Intergradation with *pallidisima* has already been discussed under that race, but this takes place in San Luís Potosí (probably) and southwestern Tamaulipas.

Regarding the type of *boucardi*, Allan R. Phillips and Ian Galbraithe kindly compared it to a series that I had sent to them as representing the possible populations from which it could have come. They concluded that the name is best applied as used here.

Measurements: Hidalgo ♂♂ average longer in tail and culmen than ♂♂ in other populations represented by samples of five or more specimens (Tables 1 and 2); the differences are not significant.

Juvenal plumage: Resembles that of *pallidisima*, but dorsally averages redder in two specimens; a Tlaxcala specimen is darker and grayer (less reddish) and more heavily streaked above than the Guanajuato specimens.

Specimens examined: FRESH PLUMAGE—San Luís Potosí 2, Hidalgo 2, Veracruz 1, Querétaro 1, Guanajuato 5 (also 5 *boucardi* × *simulans*), Michoacán 1. MORE-WORN PLUMAGE—San Luís Potosí 22, Hidalgo 19, Guanajuato 7 (also 4 *boucardi* × *simulans*), Tlaxcala 2, Puebla 1. JUVENAL PLUMAGE—Guanajuato 2, Tlaxcala 1.

Range: Southern third of San Luís Potosí, southwest to northernmost Michoacán and south through Tlaxcala and adjacent central Puebla.

***Aimophila ruficeps duponti* ssp. nov.**

Type: DMNH 40,055, ad. ♂, 3 km. W of Puente Colorado, D. F., Mexico; collected on 26 October 1968 by A. R. Phillips (orig. no. 9875).

Diagnosis: This is the darkest, grayest race of the species, differing from *boucardi* in having the back much darker and grayer, the crown darker and less reddish brown, the dorsal streaking grayer (less reddish brown), the breast and flanks darker and more grayish brown, and the wings and tail darker and less reddish brown.

Description: The crown is between Chocolate and light Seal Brown; some specimens have this paler and redder, toward dark Burnt Umber. Dorsal streaking is dark brown, closest to Prouts Brown; it is extensive and usually broad and fairly sharp (may be diffuse). The back is dark Hair Brown, paler and more grayish brown in some specimens. Breast and flanks are between Broccoli Brown and Hair Brown. Wings and tail are dark Mummy Brown.

Commentary: The series is rather uniform, although two of the eight specimens are somewhat paler above than the others and have redder crowns and dorsal streaking. These two resemble *boucardi* but are darker below and, to some degree, above.

Measurements: See Tables 1 and 2.

Juvenal plumage: No specimens seen.

Specimens examined: FRESH PLUMAGE—Distrito Federal 8. MORE-WORN PLUMAGE—Distrito Federal 8, State of Mexico 1 (very worn—assignment to *duponti* provisional).

Etymology: Named for John E. duPont, in appreciation for his support and friendship.

Range: Apparently confined to the Valley of Mexico in the Distrito Federal (Mixcoac, Pedregal, Tlalpam, Puente Colorado, City of Mexico); possibly also in adjacent Mexico (La Venta—MC).

***Aimophila ruficeps laybournae* ssp. nov.**

Type: DMNH 40,056, ♀, 5.5 km. NNE of Chapulco, Puebla, Mexico; collected on 25 December 1969 by A. R. Phillips (orig. no. 9972), prepared by Santos Farfán B.

Diagnosis: A pale race, with grayish upperparts and dusky streaking, differing from *duponti* in being much paler and from *boucardi* and more southern races in being grayish dorsally rather than reddish brown. Also shorter in wing and tail than *duponti* and *boucardi* (significantly so in regard to the former) and less extensively streaked than these races.

Description: The crown is between dark Vandyke Brown and Burnt Umber. Dorsal streaking is moderately extensive and rather narrow and diffuse; color varies, but typically dark Olive. Back is Hair Brown, with some gray to buff tones. Breast and flanks are Broccoli·Brown to more grayish brown. Wings and tail are dark Mummy Brown, washed with Olive.

Commentary: In the series of fresh-plumaged birds there is some variation, even in the two topotypes. In adjacent Oaxaca, one specimen (Tamazulapan—DMNH) is slightly darker and another (near Huajuapan de León—DMNH) is darker yet, the latter perhaps because it is in the midst of molt; another molting specimen from the latter area (MMNH) is pale. One Veracruz (Acultzingo—DMNH) specimen is darker and more reddish in its streaking than the type, but it is somewhat worn, as are two more typical specimens (Maltrata; Orizaba—both US) from there. Overall, *laybournae* is a grayish race throughout its prescribed range, although varying to some degree in darkness.

Measurements: See Tables 1 and 2.

Juvenal plumage: Resembles that of the Tlaxcala *boucardi* mentioned above and thus grayer (less reddish), darker, and more heavily streaked than the Guanajuato examples of *boucardi*.

Specimens examined: Fresh plumage—Veracruz 1, Puebla 2, Oaxaca 3. More-worn plumage—Veracruz 3, Oaxaca 7. Juvenal plumage—Veracruz 1, Oaxaca 2.

Etymology: Named for Roxie C. Laybourne, in recognition of and appreciation for her service to ornithology.

Range: West-central Veracruz (Orizaba area) west through southeastern Puebla to adjacent north-central Oaxaca.

Aimophila ruficeps australis **(Nelson).** Auk, 14:63, 1897. Type locality: City of Oaxaca [= Cerro San Felipe], Oaxaca, Mexico; type in the USNM, 136,131 (examined).

Diagnosis: A distinctly reddish race, differing markedly in this regard from the grayer *laybournae* to the north in having the back, breast, and sides buffier and the crown, and especially the dorsal streaking, redder (less brownish or dusky). Size similar in the two races.

Description: The crown is near dark Burnt Umber. Dorsal streaking is moderately extensive, rather narrow, and fairly sharp; the color is near

Vandyke Brown. Back is near Broccoli Brown. Breast and flanks are light Broccoli Brown, and wings and tail light Mummy Brown.

Commentary: Two November specimens from 25 miles SE of Nochistlán (DMNH) are rather uniform in color, while a February specimen from 45 road miles NW of Oaxaca City (MC) is paler—as befits its more worn state. A very worn July specimen (US—type) from the same area is also pale and reddish, while a May bird from near Chicahuaxtla (CA) is dark red.

Measurements: See Tables 1 and 2.

Juvenal plumage: Similar to *laybournae,* but slightly paler, redder (less grayish), and less heavily streaked.

Specimens examined: FRESH PLUMAGE—Oaxaca 3. MORE-WORN PLUMAGE—Oaxaca 5. JUVENAL PLUMAGE—Oaxaca 2.

Range: Apparently restricted to central Oaxaca, occurring from the ridges at the northern end of the Valley of Oaxaca, north to Chicahuaxtla and near Nochistlán.

Aimophila ruficeps extima **Phillips.** Bull. Brit. Ornithologist Club, 86:155, 1966. Type locality: 2 km. NW of Portillo Nejapa (ca. 16°34′ N, 95°57′ W); type in the DMNH, 18,521 (examined).

Diagnosis: In most specimens, *extima* is browner than either the reddish *australis* or the grayish *laybournae.* Specifically, it has the back more grayish brown and the dorsal streaking broader and browner, less reddish than *australis.* Compared to *laybournae, extima* is browner in the color of the back and in its broader dorsal streaking. The sizes of the three forms are similar.

Description: The crown is light to dark Walnut Brown. Dorsal streaking is rather extensive, broader, and generally sharp; the color varies from dark Prouts Brown to Mummy Brown. Back color is typically light Hair Brown, with some specimens buffier and others grayer. Breast and flanks are Broccoli Brown, with both paler and grayer coloration in some specimens. Wings and tail are Mummy Brown.

Commentary: This is a variable race, even in southern Oaxaca, including in the color of the crown and back and in the extent and color of the dorsal streaking. The type, from Portillo Nejapa, is a rather gray-backed bird with brown streaking. It is matched by two specimens from nearby Miahuatlán and one from San Bartolo Coyotepec (CA, DMNH). However, two other specimens from each of these localities are browner in ground color, with darker crowns and darker, redder, and more extensive streaking. These darker specimens show some approach to the redder *australis,* but they are much closer to the brown and gray *extima.*

I also include Guerrero (mainly Chilpancingo) birds in *extima,* as six of ten specimens from there agree rather closely with the type. The

other four are grayer and/or more dusky-streaked above, suggesting *laybournae*; however, the Guerrero specimens differ from the latter race in averaging somewhat more brownish (less grayish) above. Finally, a February specimen from southern Puebla (Chila de Sal—UMMZ) can also be assigned to *extima*.

Measurements: In wing and tail (Table 1), the Oaxaca sample averages insignificantly larger than Guerrero birds, whereas the latter averages slightly larger-billed (Table 2).

Juvenal plumage: Similar to *australis*, but paler and grayer above in two Oaxaca *extima* and grayer yet in a Guerrero one.

Specimens examined: FRESH PLUMAGE—Guerrero 11, Puebla 1, Oaxaca 8. MORE-WORN PLUMAGE—Guerrero 51, Puebla 1, Oaxaca 16. JUVENAL PLUMAGE—Guerrero 1, Oaxaca 2.

Range: Guerrero (Cuapongo, Omilteme, Chilpancingo) and adjacent Puebla (Chila de Sal, Tehuitzingo) south through southern Oaxaca.

***Aimophila ruficeps fusca* (Nelson).** Auk, 14:62, 1897. Type locality: Etzatlán, Jalisco; type in the USNM, 135,909 (examined).

Diagnosis: A rather dark race, extensively and broadly streaked above with reddish brown, with rather dark brownish gray back, breast, and sides. Differs from *boucardi* in being much more reddish (less brownish) and more broadly streaked, with buffier back and underparts; averages somewhat shorter in wing and tail, but not significantly so.

Description: The crown is dark Burnt Umber, with some specimens either redder or darker. Dorsal streaking is extensive, broad, and moderately sharp; the color is Burnt Umber to Vandyke Brown. Back color is Hair Brown with buff tones. Breast and sides are Broccoli Brown with moderate buffy wash. Wings and tail are Mummy Brown.

Commentary: *Fusca* is rather uniform in the series presently available, varying mainly in minor details. Evidence of intergradation with *boucardi* is seen in single specimens from Michoacán (Patambán—US) and Guanajuato (Acámbaro—DMNH), but both of these are closer to *boucardi*. An intergrade with *suttoni* (see following) was seen from southern Jalisco (Los Masos—AMNH).

Measurements: See Tables 1 and 2.

Juvenal plumage: Dorsally dark and red (Mummy Brown or paler); much darker and redder (less grayish) than the adjacent *boucardi*.

Specimens examined: FRESH PLUMAGE—Michoacán 6, Jalisco 3. MORE-WORN PLUMAGE—Michoacán 25, Jalisco 1. JUVENAL PLUMAGE—Michoacán 4.

Range: Northern Michoacán and eastern Jalisco (south of Lake Chapala), intergrading to the north with *boucardi* and to the west with *suttoni*.

***Aimophila ruficeps suttoni* ssp. nov.**

Type: DMNH 40,054, im. ♂, 24.5 miles SE of Tepic, Nayarit; collected on 24 October 1957 by A. R. Phillips (orig. no. 4618).

Diagnosis: Resembles *simulans* (described later), but in fresh plumage the back is buffier (less grayish), the dorsal streaking redder (less brownish), and the crown more often divided by buffy center stripe (this is more frequent than in any other race); wing and tail average shorter, but not significantly so. Compared to *boucardi*, *suttoni* is buffier above, with less extensive and redder streaking; wing and tail significantly shorter. Compared to *fusca*, *suttoni* is paler above and below, with less extensive and browner (less reddish) streaking. Compared to *extima*, *suttoni* is buffier (less grayish) on the back, with the crown darker, the dorsal streaking redder (less brownish), and the breast and sides darker and browner (less grayish). In size, *suttoni* is significantly shorter in wing and tail than *boucardi*, but it overlaps with one or more populations of *simulans* and with *fusca* and *extima*.

Description: The crown is between dark Walnut Brown and dark Burnt Umber. Dorsal streaking is moderately extensive, fairly broad, and usually sharp; the color is near Prouts Brown or somewhat redder. Back color is between Broccoli and Hair Brown, as are breast and flanks, which may be overlaid with buffy. Wings and tail are light Prouts Brown.

Commentary: Nayarit specimens are generally similar inter se, as are most of those from Jalisco; however, one of two from Autlán (DMNH) is very different, being more grayish and brown, perhaps most suggesting intergradation between *boucardi* and *fusca*. Four January-February specimens (AMNH) from near Guadalajara are somewhat worn, but appear to be close to *suttoni*.

Measurements: See Tables 1 and 2.

Juvenal plumage: Most similar to *fusca*, but dorsally darker and duskier (between Mummy Brown and Prouts Brown) in Nayarit specimens; Jalisco specimens from Bolaños and Mezquitic (both US) are similar to these, but somewhat paler above.

Specimens examined: Fresh plumage—Nayarit 3, Jalisco 7. More-worn plumage—Nayarit 29, Jalisco 7. Juvenal plumage—Nayarit 4, Jalisco 3.

Etymology: Named for George M. Sutton, in recognition of his studies of Mexican and other birds.

Range: Eastern Nayarit (Santa Teresa southward) and western and northern Jalisco; probably also in Colima, where a specimen is recorded by Schaldach (1963:97).

***Aimophila ruficeps phillipsi* Hubbard and Crossin.** Nemouria, No. 14, p. 33, 1974. Type locality: Rancho Carrizo, 6.5 miles W of Palmito, Sinaloa; type in the DMNH, 13,198 (examined).

Diagnosis: A very dark race, much darker than any of the adjacent forms. Differs from *simulans* and *suttoni* in being darker, browner, and more extensively streaked above, as well as darker on the breast and sides; also darker and browner (less reddish) than the more distant *fusca* and browner (less grayish) than *duponti*. Size similar to that of *suttoni*, but wings and tail averaging shorter than in most *simulans* populations.

Description: The crown is between dark Walnut Brown and Seal Brown. Dorsal streaking is similar to crown in color; it is extensive, broad, and rather sharp. Back is near Broccoli Brown, as are breast and sides. Wings and tail are dark Mummy Brown to dark Vandyke Brown. Variation occurs mainly in the darkness of the crown and dorsal streaking, with some specimens being paler than others.

Measurements: See Tables 1 and 2.

Juvenal plumage: The one specimen seen is too worn to provide a description of this plumage in *phillipsi*.

Specimens examined: FRESH PLUMAGE—Sinaloa 8. MORE-WORN PLUMAGE—Sinaloa 7. JUVENAL PLUMAGE—Sinaloa 1.

Range: Known only from the barranca country in southeastern Sinaloa (Palmito area), but probably ranges along the western slope of the Sierra Madre Occidental.

***Aimophila ruficeps simulans* van Rossem.** Bull. Mus. Comp. Zool., 77:486, 1934. Type locality: Mina Abundacia, Chihuahua [= Sonora]; type in the MCZ, 22,783 (examined).

Diagnosis: Similar to *scottii*, but slightly to notably darker throughout and averaging shorter in wing and tail (significantly so only in northeastern Sinaloa populations). Specifically, the crown and dorsal streaking average darker and browner (less reddish) in *simulans*, and the back and the breast and sides are usually darker. Compared to *boucardi*, *simulans* is redder (less brownish) on the crown and in the dorsal streaking; the latter form also tends to be paler than *boucardi* on the back, breast, sides, wings, and tail. Compared to *phillipsi*, *simulans* is much paler throughout and is less extensively streaked above. (Also see *suttoni*.) In size, *simulans* is quite variable and overlaps all adjacent races—depending on the populations compared.

Description: The crown is between Walnut Brown and Vandyke Brown. Dorsal streaking is similar in color to the crown but averages redder (less brownish); it is moderate in extent, generally fairly broad and sharp (may be diffuse). Color of the back is between light Drab and Broccoli Brown. The breast and flanks are light Broccoli Brown. Wings and tail are near light Prouts Brown.

Commentary: I have no fresh-plumaged topotypes, but variability exists in the small series of specimens from nearby areas of Sonora and Sinaloa. This variability extends to all color characters, but perhaps is most notable in the color of the back. In this character, the color varies from a rather light gray to a darker brownish gray; coloration of the crown, streaks, breast, and sides also varies (between rather light to darker) in these specimens. In the series of fresh-plumaged and post-juvenally molting specimens from farther South in Sinaloa (Milpillas, Rancho Babizos, Suratato—all MC), one specimen approaches *phillipsi* and the other two are close to *simulans.*

East of the Sierra Madre Occidental, a series of birds from southwestern Chihuahua (southwest of Hidalgo del Parral) and adjacent Durango (Tepehuanes) shows a greater tendency toward gray back color than Sonora-northern Sinaloa specimens; however, five of the eight specimens match one or more of the more western specimens, and the entire series is best referred to *simulans.* Farther south, the status of *simulans* is not yet subject to satisfactory clarification, as fresh-plumaged specimens are few. However, in discussing other races, I indicated that *simulans* characters were seen in specimens from as far south as Guanajuato (Rancho Enmedio). Based on this apparent intergradation (i.e., *simulans* × *boucardi*) and on two *simulans*-like juveniles from Zacatecas (Monte Escobedo—US, DMNH), I am provisionally extending the range of this race southward through Zacatecas to northeastern Jalisco (Lagos de Moreno—MC).

Measurements: Wing and tail length are variable among the various populations assigned to this race, with northeastern Sinaloa birds being smallest and southwestern Durango/Zacatecas being largest. Although comparisons reveal that differences are not significant, the trends suggest that Sinaloa birds are intergrades in these characters with the smaller *phillipsi,* while those from southern Durango/Zacatecas are intergrades with the larger *simulans.* Trends in bill size are less clearcut, and the differences are not significant.

Juvenal plumage: Much paler and less dusky reddish (Russet to light Prouts Brown) above than *suttoni* and paler and somewhat redder than *boucardi.*

Specimens examined: FRESH PLUMAGE—Sonora 3, Sinaloa 2, Chihuahua 9, Durango 3. MORE-WORN PLUMAGE—Sonora 17, Sinaloa 16, Chihuahua 14, Durango 33, Zacatecas 4, Jalisco 6. JUVENAL PLUMAGE—Sonora 3, Sinaloa 2, Chihuahua 9, Durango 3, Zacatecas 2, Jalisco 1.

Range: East-central Sonora (Batuc) south through northeastern Sinaloa, southwestern Chihuahua, western Durango (east of the Sierra Madre Occidental), and probably Zacatecas and northeastern Jalisco; intergrades with *simulans* in northern Guanajuato (Rancho Enmedio).

Aimophila ruficeps scottii **Sennett.** Auk, 5:42, 1888. Type locality: Pinal Co., Arizona; type in the AMNH (examined).

Aimophila ruficeps tenuirostra Burleigh and Lowery. Occ. Papers, Mus. Zool. Louisiana St. Univ., No. 6:67, 1939. Type locality: McKittrick Canyon, Guadalupe Mountains, Culberson Co., Texas; type in LSU, 3,334 (not seen).

Aimophila ruficeps rupicola van Rossem. Auk, 63:562, 1946. Type locality: north slope of the Harquahala Mountains, Yuma Co., Arizona; type in UCLA (Dickey Coll.), 33,183 (not seen).

Diagnosis: *Scottii* differs from *eremoeca* in the gray (rather than Olive) cast to the back and in having the dorsal streaks redder (less brownish) and usually broader and more extensive. *Scottii* usually has the crown and dorsal streaking paler and somewhat less brownish than *simulans* and tends to be paler overall. From *eremoeca* and adjacent populations of *simulans*, *scottii* does not differ significantly in size; however, *scottii* averages slightly longer in tail and shorter in bill than *eremoeca* and longer in wing and tail than *simulans* (significantly so compared to the northeastern Sinaloa population of the latter form).

Description: The crown is medium reddish brown, typically between Chestnut and Burnt Umber, but sometimes paler and redder or darker and browner (toward Walnut Brown). Dorsal streaking is similar to, to somewhat paler than, crown color; it is usually moderate in extent, fairly broad and sharp (may be diffuse). Color of back is variable, but typically pale brownish gray (near light Drab). Breast and flanks are pale grayish brown (near pale Broccoli Brown), but variable. Wings and tail are light reddish brown, near light Mummy Brown.

Commentary: In southeastern Arizona *scottii* is relatively homogeneous in its plumage coloration, but darker specimens approaching *simulans* do occur there (e.g., single birds from the Santa Rita and Huachuca Mountains—both US); I have also seen one quite pale *eremoeca*-like bird from there (Nogales area—AMNH). Westward, in the Ajo and Harquahala Mountains, darker birds are more frequent (*A. r. "rupicola"*), but these are by no means dominant. For example, five of 10

Harquahala specimens are darker on the average than more eastern Arizona *scottii*, but of these only two are darker than the extreme of *scottii*. In the Ajos, three of six are darker than average, but none exceeds the dark extreme of *scottii*. Because of the overlap in this and all other characters, I have lumped *rupicola* with *scottii*.

Southward in Sonora, *scottii* is also marked by darker specimens, e.g., in the Sierra Pinitos area (3 of 7), Sierra San Antonio (1 of 3), and Sierra Aconchi (1 of 5); however, none of these is darker than the extreme of *scottii* from southeastern Arizona. The northward limit of *simulans* is in central Sonora (Batuc), and perhaps dark specimens to the north and even in western Arizona could be regarded as intergrades between that race and *scottii*.

In northern Chihuahua I have no information on the variability of *scottii*, and that area is included in the range of this race mainly on the basis of a few rather worn specimens. However, a molting juvenile from Colonia Pacheco (MC) is assignable to *scottii* on the basis of the visible definitive plumage on the back and breast.

In southwestern New Mexico, west of the Rio Grande, specimens agree closely with southeastern Arizona *scottii*, except for one that is paler than average from Hidalgo County (Peloncillo Mts.—MSB). Eastward and northward in New Mexico exists a trend of birds being somewhat paler and grayer above and less heavily streaked than typical *scottii*. This tendency is not so prevalent that the population can be subspecifically separated from more western *scottii*, but it is nonetheless apparent. The same tendency also occurs in westernmost Oklahoma (Cimarron Co.), as well as in the Guadalupe Mountains of New Mexico-Texas (*A. r. "tenuirostra"*). These birds resemble certain of the variants of *eremoeca* (i.e., those that approach *scottii*) from farther east in Oklahoma, but they occur in populations that are otherwise typical of *scottii*. I would call them *scottii*, except in the Guadalupes, where the combination of characters warrants the designation of the population as "*scottii* approaching *eremoeca*." As for the Guadalupe Mountain birds being separable as a narrow-billed race, i.e., *tenuirostra*, I find the population to be inseparable either from Texas *eremoeca* or from *scottii* in this regard; they do average somewhat longer-billed than the latter.

From Colorado and Kansas, I have seen no specimens; but I suspect that they are close to *scottii* from Cimarron County, Oklahoma.

Measurements: Guadalupe Mountains and Cimarron County samples average larger (not significantly so) in wing and tail than those to the west. In bill, Guadalupe Mountains birds average somewhat longer than in typical *scottii* populations, but the differences are not significant.

Juvenal plumage: Similar to *simulans*, but paler on the upperparts (Broccoli Brown to pale Prouts Brown); generally redder and darker than *eremoeca*, but occasional variants of *scottii* are similar to that race, e.g., one from Greenlee Co., Arizona (DMNH).

Specimens examined: FRESH PLUMAGE—Arizona: Cochise Co. 12, Coconino Co. 1, Gila Co. 3, Maricopa Co. 2, Pima Co. 20, Pinal Co. 1, Santa Cruz Co. 6, Yavapai Co. 1, Yuma Co. 8. New Mexico: Bernalillo Co. 2, Catron Co. 2, DeBaca Co. 1, Doña Ana Co. 3, Eddy Co. 1 (*scottii* × *eremoeca*), Hardy Co. 3, Hidalgo Co. 3, Otero Co. 4. Oklahoma: Cimarron Co. 9. Texas: Culberson Co. 6 (*scottii* × *eremoeca*), El Paso Co. 1. Sonora 21. MORE-WORN PLUMAGE—Arizona: Cochise Co. 8, Graham Co. 1, Pima Co. 7, Santa Cruz Co. 4, Yuma Co. 3. New Mexico: Catron Co. 4, Doña Ana Co. 1, Grant Co. 8, Hidalgo Co. 3, Luna Co. 2, Otero Co. 1, San Miguel Co. 1, Sierra Co. 1, Union Co. 1. Oklahoma: Cimarron Co. 1. Texas: Culberson Co. 2 (*scottii* × *eremoeca*). Sonora 24. Chihuahua 7. JUVENAL PLUMAGE—Arizona: Cochise Co. 1, Greenlee Co. 1, Pima Co. 6, Santa Cruz Co. 2. New Mexico: Eddy Co. 1 (*scottii* × *eremoeca*), Grant Co. 2, Luna Co. 1. Sonora 3. Chihuahua 3.

Range: Northern Arizona (Grand Canyon), central New Mexico (Sandia Mountains), and western Oklahoma (Cimarron County) south to north-central Sonora (Aconchi, Montezuma), northwestern Chihuahua (Colonia Pacheco, Casas Grandes), and westernmost Texas (El Paso). Intergrades with *eremoeca* in the Guadalupe Mountains (Texas, New Mexico) and (individually) in the Davis Mountains, more eastern New Mexico, Oklahoma, and northern Texas.

KEY TO SUBSPECIES

This key is based on specimens in relatively fresh definitive plumage and representing more-or-less typical examples of the 12 races recognized in this study. More-worn specimens must be allocated provisionally and on the basis of geographic probability, while atypical fresh-plumaged specimens must be identified through detailed comparisons with more typical birds. This key also serves to summarize the geographic variation in plumage characters in this species and to underscore the "strange, almost haphazard geographic variations" (Phillips, 1966:156) found in this species. A summary of mensural variation is given following the key (see also Tables 1 and 2). The key begins on page 24.

1. Notably dark races, with the dorsal streaking tending to be broader and more extensive (confined to Mexico) 2
1. Distinctly less dark races, with streaking variable but usually narrower and/or less extensive (Mexico and Southwest) 4
2. Dorsal streaking and crown distinctly more gray brown; underparts mainly gray or grayish brown (little or no buff); tail 69.0 or more in ♂♂ and 64.5 or more in ♀♀ . . . . . *duponti* (Distrito Federal)
2. Dorsal streaking and crown redder; underparts often with buff; tail 68.0 or less in ♂♂ and 66.5 or less in ♀♀ 3
3. Dorsal streaking and crown browner and darker; wings of ♂♂ average 60.4 ± 1.6 (58.0–62.0) and ♀♀ 57.6 ± 2.1 (55.0–60.0) . . . . . *phillipsi* (southeastern Sinaloa)
3. Dorsal streaking and crown redder and paler; wings of ♂♂ average 63.6 ± 1.6 (60.5–67.0) and of ♀♀ 60.2 ± 1.4 (58.5–62.0) . . . . . *fusca* (Jalisco and Michoacán)
4. Rather pale throughout, with back olive gray and dorsal streaking generally brownish or dusky and not extensive . . . . . *eremoeca* (most of Texas, northern Coahuila, and all but Panhandle of Oklahoma—including some intergrades toward *scottii*)
4. Darker, more reddish streaked and/or more extensively streaked races 5
5. Back rather buffy and dorsal streaking quite reddish 6
5. Back grayer or browner and dorsal streaking browner or grayer 7
6. Averages slightly more grayish buff on the back, breast, and sides, with the dorsal streaking and crown slightly browner and paler; bill slightly larger, i.e., average ♂♂ length (from nostril) 8.2 ± 0.4, width (at base) 6.4 ± 0.3, depth 6.3 ± 0.2 . . . . . *suttoni* (Nayarit, northern and western Jalisco)
6. Averages slightly buffier on the back, breast, and sides, with the dorsal streaking and crown slightly redder and darker; bill slightly smaller, i.e., average of ♂♂ length 8.0, width 6.1, depth 6.1; ♀♀ length 7.7, width 6.0, depth 6.2 . . . . . *australis* (central Oaxaca)

7. Back more olive gray, dorsal streaking more grayish brown 8
7. Back clear gray, dorsal streaking more reddish brown 9
8. Dorsal streaking averages darker, grayer, and sharper; breast and sides average slightly darker; bill averages shorter in ♂♂, i.e., 8.3 ± 0.4 (8.6 in 3 ♀♀) . . . . . *laybournae* (Veracruz, Puebla, and Oaxaca)
8. Dorsal streaking averages paler, browner, and more diffuse; breast and sides average paler; bill averages longer in ♂♂, i.e., 8.6 ± 0.4 to 8.9 ± 0.3, depending on the population (8.4 ± 0.2 to 8.7 ± 0.5 in ♀♀) . . . . . *pallidisima* (southern Coahuila, Nuevo León, Tamaulipas, northern San Luís Potosí)
9. Paler race, including on the back, crown, dorsal streaking, breast, and sides . . . . . *scottii* (Arizona, northeastern Sonora, northwestern Chihuahua, southern and eastern New Mexico, westernmost Oklahoma; intergrades with *eremoeca* in Guadalupe Mountains of New Mexico and Texas and [individually] elsewhere to the north, east, and south)
9. Darker races 10
10. Back buffier . . . . . *extima* (Guerrero, adjacent Puebla, and southern Oaxaca)
10. Back grayer 11
11. Dorsal streaking and crown somewhat darker and browner; back, breast, and sides slightly darker and browner . . . . . *boucardi* (southern San Luís Potosí, Guanajuato, Querétaro, northwestern Veracruz, Hidalgo, Tlaxcala, adjacent Puebla, intergrading with *fusca* in northern Michoacán)
11. Dorsal streaking and crown somewhat redder; back, breast, and sides slightly paler and grayer . . . . . *simulans* (south Sonora, northeast Sinaloa, southwest Chihuahua, Durango, Zacatecas, northeast to Jalisco; intergrades with *simulans* in northern Guanajuato)

VARIATION IN MEASUREMENTS

Wing length: The populational differences between the largest and the smallest mean wing length (subsamples of five or more specimens) is only 7.9 mm in males and 7.4 mm in females. As a consequence of these small differences and the clinal nature of the variation in this character, adjacent populations and subspecies tend not to differ significantly (see Table 1). An exception is in the case of *duponti,* which is significantly longer-winged than races to the south and west, i.e., *laybournae* and *extima.* In general, the longest-winged birds are *scottii, eremoeca,* and *duponti,* while the shortest-winged are *laybournae, australis, extima, suttoni, phillipsi,* and some populations of *simulans* and *pallidisima.* The latter two races demonstrate heterogeneity in that some populations are short-winged and others are medium-winged. Thus, discordancy exists between patterns of variation in wing length and in plumage characters in some races of *A. ruficeps.*

Tail length: The populational differences between the largest and smallest mean tail length (subsamples of five or more) are 10.7 mm in males and 10.1 mm in females. In general, the variation described above in wing length also applies to the length of tail, with a few exceptions. Longest in tail are *scottii, eremoeca,* and *duponti,* plus *boucardi* and westernmost *pallidisima*; shortest are *laybournae, australis, extima, suttoni, phillipsi,* certain populations of *simulans* and *pallidisima,* plus *fusca. Duponti* is significantly larger than the adjacent *laybournae* and *extima,* plus *fusca.* Heterogeneity is again marked in *simulans* and *pallidisima,* particularly the latter, which grades from the shortest-tailed population measured (Sierra de Tamaulipas) to one of the longest-tailed (Saltillo).

Interestingly, although length of tail generally parallels that of wing in the geographic variation, selected Corner tests (Steel and Torrie, 1960) reveal that the two characters are not correlated. In view of their independent variation, one is thus not justified in a detailed treatment of the two measurements as a ratio. However, a general assessment of the relationship of mean wing length to mean tail length within populations perhaps commits no great violence to statistical theory. Based on this, what one finds is that in the longer-tailed populations a greater difference exists between lengths of tail and of wing, while in shorter-tailed populations the reverse is true. Thus, in males of *scottii,* population ratios are 93.7 to 95.1 percent, in *duponti* 93.9, and in Saltillo-area *pallidisima* 93.3; *eremoeca* and *boucardi* show less agreement with the above generalization, with respective values of 93.8 to 98.5 and 95.4 to 97.9 percent. In shorter-tailed populations, the values include eastern *pallidisima* with 96.4 to 98.7 percent, *laybournae* 99.1,

australis 98.1, *extima* 97.6 and 98.1, *fusca* 100.0, and *simulans* (northeastern Sinaloa) 98.5; *phillipsi* is lower than expected, at 96.0 percent. Basically, what these values suggest is that tail length increases at a more rapid rate in populations than does wing length.

Bill: Length, width, and the depth of bill all border on being mosaic in their geographic variation, and no populations or races are significantly different in their measurements. *Eremoeca* and *pallidisima* have the longest average bill length, with those of the latter race from the Sierra de Tamaulipas being the extreme, at 8.9 mm in males and 8.7 in females. Elsewhere bill length averages somewhat shorter, ranging from 8.0 to 8.5 in both sexes (throughout the area studied, males and females are similar in all bill measurements, or females average slightly smaller).

In bill depth the largest means are found from Oklahoma through eastern and southern Mexico (all or parts of the populations of *eremoeca, pallidisima, boucardi, duponti, laybournae, extima, fusca, suttoni,* and probably *australis*), but the differences in means are minor, i.e., in the range 6.3 to 6.5 (males) versus 5.9 to 6.2 (males) in populations of races with smaller bill depth. Bill width essentially parallels bill depth in its geographic variation; and, as with that latter character, the differences among populations are minor (and statistically insignificant).

Body weight: Only about 10 percent of the more than one thousand specimens examined had weight data on their labels. I do not consider this sufficient for a meaningful analysis and prefer to make no generalizations concerning it; however, this does point out the need for weight data on this (and in many other) species.

SUMMARY

Geographic variation is described in the essentially resident populations of *Aimophila ruficeps* distributed from western Arizona eastward to central Oklahoma and southward to southern Oaxaca, Mexico. Based primarily on characters of relatively fresh, definitively plumaged specimens, 12 subspecies are recognized over this area, i.e., the previously described races *eremoeca, pallidisima, boucardi, australis, extima, fusca, phillipsi, simulans,* and *scottii,* plus the here-described *duponti* (Distrito Federal), *laybournae* (southwestern Veracruz to northernmost Oaxaca), and *suttoni* (Nayarit and adjacent Jalisco). The race *rupicola* is regarded as a synonym of *scottii,* and *tenuirostra* is considered an intergrade between *scottii* and *eremoeca* (closer to the former). Plumage characters are described in detail, measurements are presented and discussed, and a key to the subspecies is provided.

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